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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,710	12/07/2005	Sebastian Kanne	R.305558	1888

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EXAMINER

MCGRAW, TREVOR EDWIN

ART UNIT	PAPER NUMBER
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3752

MAIL DATE	DELIVERY MODE
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11/15/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/559,710

Applicant(s)

KANNE ET AL.

Examiner

Trevor McGraw

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10,11,16-20 and 24-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10,11,16-20 and 24-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/2007 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a

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question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 10 recites the broad recitation "internal combustion engine", and the claim also recites "in particular direct-injection diesel engines" which is the narrower statement of the range/limitation. Examiner suggests amending Claim 10 to distinctly identify and claim Applicant's invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10, 11, 18, 19, 24-25 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Kappel et al. (DE 4306073).

In regard to Claims 10, 11, 18, 19, 24-25 and 27, Kappel et al. (DE 4,306,073) teaches an injector for fuel injector systems of internal combustion engines, in particular direct injection diesel engines, where the injector has a piezoelectric actuator (P) located in an injector body (GH) and is held in contact with the injector body (GH) on one side (Figure 1) and has a sleeve like booster piston (DK) having an inner chamber (KA2), a nozzle

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body which is joined to the injector body (GH) and has at least one nozzle outlet opening (EO), a stepped nozzle needle (VN) that is guided axially displaceable in the nozzle body (VK) and a second spring (RF) is disposed inside the booster piston (DK) where the second spring (RF) with the injection pressure acting on the back side of the nozzle needle (VN) keep the nozzle needle in the closing position and a control chamber (KA1) is embodied on the end toward the nozzle needle (VN) of the booster piston (DK) and communicates with at least one leakage gap (KS1, KS2) where the leakage gaps (KS1, KS2) have hydraulic communication between the inner chamber (KA2) of the booster piston (DK) at injection pressure and with a fuel supply (SP) that is also at injection pressure, the nozzle needle (VN) is guided in the inner chamber (KA2) of the booster piston and is urged in the opening direction by the fuel located in the control chamber (KA2) where the booster piston (DK) is actuated by the piezoelectric actuator is spatially or spaced directly with the nozzle needle (VN) so that the nozzle needle (VN) is fitted with a rear region (HK) that has a larger diameter than a region of the nozzle needle (VN) toward the nozzle outlet (EO) into the inner chamber (KA2) of the booster piston (DK).

The diesel fuel injector of Kappel et al. also teaches where the nozzle body (VK) adjoins the injector body (GH) on the face end in the flow direction and the piezoelectric actuator (P) extends as far as the end toward the nozzle body (VK) of the injector body (GH) where the piezoelectric actuator (P) is centered in an axially cylindrical recess (LA) of the injector body (GH) in such a way that an annular chamber is created between the outer wall of the piezoelectric actuator (P) and the inner wall of the cylindrical recess of

the injector body (GH) where the annular chamber communicates hydraulically directly with the fuel supply (SP) that is at injection pressure and the annular chamber (Figure 9) extends into the region of the booster piston (KA3) axially adjoining the piezoelectric actuator (P) and where the inner chamber (KA2) of the booster piston (DK) communicates hydraulically with the annular chamber and the fuel supply (SP) and the pressure booster (DK) is guided in the nozzle body (VK) with a leakage gap that is created between the annular chamber and the control chamber at injection pressure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 16, 17, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kappel et al. (DE 4,306,073) in view of Bart (US 4,022,166).

In regard to Claims 16, 17, 20 and 26, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a compression spring concentrically surrounding the booster piston located in a lower region of the annular chamber associated with the booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so

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the piezoelectric actuator and the booster piston are kept in contact with one another by non-positive engagement. Bart (US 4,022,166) teaches that it is known to have a compression spring concentrically surrounding a booster piston located in a lower region of an annular chamber associated with a booster piston where the compression spring is braced toward the piezoelectric actuator on a collar of the booster piston and toward the nozzle outlet on a rear end face of the nozzle body so the piezoelectric actuator and booster piston are kept in contact with one another by non-positive engagement (Figure 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide Kappel et al. with the concentric spring, booster piston, collar and piezoelectric actuator arrangement of Bart (US 4,022,166) in order to provide a means for keeping the piezoelectric actuator out of positive engagement with the booster piston to avoid undesired electrical conductivity between the metallic booster piston and piezoelectric actuator which prevents material fatigue over an extended period of time due to electrical embrittlement of the metallic booster piston which ultimately affects the components performance.

Claims 28 and 29, are rejected under 35 U.S.C. 103(a) as being unpatentable over Kappel et al. (DE 4,306,073) in view of Fuessner (DE 3,519,945).

In regard to Claims 10, 28 and 29, Kappel et al. (DE 4,306,073) for at least the aforementioned reasons as described and taught above discloses the claimed invention except for a union nut securing the nozzle body to the injector body and a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where

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the cylindrical gap communicates hydraulically via recesses machined into the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the nozzle body and the injector body of the present invention separate and connected with a union nut in such a manner to create a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined in the nozzle body on one side with the annular chamber and on the other with the cylindrical pressure chamber, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

It is also noted to Applicant that it is old and well known in the art to have a union nut that secures the nozzle body of a fuel injector to the injector body of a fuel injector where a cylindrical gap between the outer wall of the nozzle body and the inner wall of the union nut where the cylindrical gap communicates hydraulically via recesses machined into the nozzle body on one side of the annular chamber and on the other with the cylindrical pressure chamber as taught by Fuessner (DE 3,518,945) making the Claims (emphasis on Claims 10, 28 and 29) of the present invention obvious over Kappel et al. (DE 4,306,073) in view of Fuessner (DE 3,518,945) .

Examiner's Comment

Claim 29 depends from previously cancelled Claim 12. Appropriate correction is required.

Response to Arguments

Rejection under 35 USC § 102

Applicant's arguments filed 10/31/2007 have been fully considered but they are not persuasive. Applicant's arguments in relation to the fuel inlet opening and the fuel chamber are unpersuasive. Although Applicant points to the fuel inlet being KRZ in the Kappel reference, Examiner notes that SP in Figure 9 supplies a fuel (oil) through a bore (GB) into the chamber KA3 through gap KH which in turn bleeds into chamber KA2 through bore BH which in turn bleeds into chamber KA1 through gap KS. Examiner has maintained the word "fuel" in its broadest sense and has viewed it as being something that maintains or stimulates an activity. This interpretation encompasses oil as being a fuel. In the case of the Kappel reference, the fuel supplied by SP cools the piezoelectric actuator and enters into chamber KA1, KA2 and KA3 where the fuel injection valve is disposed in chamber KA1 and does operate under fuel (oil supplied from SP) injection pressure from the vessel SP through bore GB. The fuel also provides a hydraulic dampening effect of the injection valve member and is maintained throughout the stimulation of the piezoelectric actuator. Furthermore, the same type of "fuel" that is present in SP is also capable of being supplied through KRZ (e.g. oil, deisel, gasoline etc.) into the chambers of the fuel injector. Thus, for these reasons aforementioned,

Examiner cannot agree with Applicant and maintains the rejections of the claims as noted in the Office Action Correspondence mailed 07/09/2007.

Rejection under 35 USC § 103

Applicant's arguments filed 10/31/2007 have been fully considered but they are not persuasive. Applicant's arguments in relation to the Bart and Fuessner references are unfounded and unsubstantiated. The combined reference of Kappel et al in view of Bart and further view of Fuessner teach all the limitations of the invention as presently claimed. The combined references do not damage the intent of one another and one having ordinary skill in the art would expect a reasonable amount of success when viewing the combined features. Thus, Examiner cannot agree with Applicant and maintains the rejection of Claims 10, 16, 17, 28 and 29 to Kappel in view of Bart as well as Kappel in view of Fuessner.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Boecking (US PG PUB 2002/0053611), Igashira et al. (US PG PUB 2002/0050535).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trevor McGraw whose telephone number is (571) 272-7375. The examiner can normally be reached on Monday-Friday (2nd & 4th Friday Off).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Shaver can be reached on (571) 272-4720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trevor McGraw
Art Unit 3752

TEM

DINH Q. NGUYEN
PRIMARY EXAMINER